THE MEDICINAL TREATMENT OF MYOCARDITIS.*

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It is difficult to write a satisfactory article upon the treatment of any disease because so much depends upon the individuality of the patient, the extent of the tissue changes, the co-existence of complications or distinct morbid conditions, all of which tend to diminish the possibility of describing a course of treatment equally applicable to any two consecutive cases.

The treatment of myocardial lesions should not be a matter of routine practice; in each case an attempt should be made to depict the condition of that particular heart, not always to regard it as a completed process in which there are localized fibrous patches, or in which the interstitial growth of connective tissue has gradually obliterated and replaced muscle fibres, but to remember that the inflammatory process in the cardiac muscles is molecular at its inception as in all other tissues and quite as amenable to treatment, and that the fibrosis denotes the completion of the process. It would indeed be a hopeless task to treat a heart in a condition of extensive fibrosis. Nor should we forget such elementary physiological facts as that the cardiac contractions can only take place as the result of chemical changes in the muscle cell; yet, practically this often takes place, and we find a course of treatment suggested that is entirely directed to influencing the heart muscle through the vagus or sympathetic nerves, without taking any precautions towards the reconstruction or preservation of muscle fibres, regardless of the fact that nerve stimulation without muscle cells is as impotent to produce a cardiac systole as is a lanyard to fire a cannon without a charge of gunpowder.

The ideas of heart disease and drugs of the digitalis group are altogether too closely associated in the medical brain, so that these medicines, although invaluable in some cases of myocardial disturbance, are only too frequently prescribed with disastrous results to the patients. Their great danger lies in the rapidity with which the patient apparently is benefited by their adminisration. I say "apparently" because the unquestionable amelioration of symptoms is obtained by stimulating the remaining healthy and partially changed fibres without improving the fibres themselves so that the actual condition of the heart is masked just as the progress of other diseases is often concealed by opium. Before proceeding further let us make our position on this topic clear:

The use of digitalis and its allies in the treatment of myocardial disorders is not condemned, it is the indiscriminate use that we deprecate; within the next few minutes it will be stated that in some cases digitalis is the only remedy, in others it occupies a secondary position, while in a third class it is absolutely useless. The pre-eminent question in the treatment of this disease must always be what can we do to improve the muscle fibre? In addition to this it may be necessary to call into play agents, medicinal and otherwise, to relieve immediate sufferings, but these latter should always aim at bringing the patient within the possibilities of his heart, not at driving the heart to meet the demands of the patient.

The subject of baths, rest and regulated exercise in the treatment of myocarditis will be presented to you by other gentlemen who participate in catering for this symposium. I would only encroach upon their domain so far as to emphasize my belief that the last is necessary in all cases, and my instructions to all patients are that they must draw a sharp line between exercise and exertion; that exercise, whether active or passive, ceases to be exercise when it produces or aggravates dyspnœa and must be discontinued until the difficulty in breathing has passed away.

Personal experience has been that the medicinal and dietetic treatment of myocardial disturbance is most satisfactorily conducted when selected according to the most prominent factor in the etiology of each case and therefore they are generally grouped somewhat in the following way:

1. Myocardial changes that are secondary to valvular lesions.
2. Myocardial changes due to infections.
3. Myocardial disturbance depending upon errors in diet and food metabolism.
4. Myocardial disorder consequent upon disordered excretions or internal secretions.
5. Myocardial asthenia secondary to the existence of neoplasms.
6. Myocarditis as a part of senile decay.

It must be understood that this is not intended to be a classification according to which the various cases can be grouped absolutely in one or other category; such a proceeding is impossible as different causes nearly always co-exist in the same patient, but generally one is pre-eminent over the others and consequently figures most prominently in directing the treatment.

1. The myocardial changes that are secondary to valvular lesions are probably the most easily treated and are best adapted to remedies of the dignitalis group. Failure of compensation in vavular lesions is not simply a matter of strain, it is really a nutritive change in the myocardium as a result of deficient or embarassed coronary circulation and must be treated as such. In lesions of the aortic valve the trouble begins as soon as the increase in muscular fibres due to hypertrophy of the left ventricle gets beyond the nutritive power of the normal coronary circulation, while in all mitral lesions the tendency from the first is to cause an increased internal pressure in the right side of the heart so that escape of blood from the coronary veins is obstructed, the cardiac muscle passes into a state of passive congestion, its nutrition is impaired and after a time degeneration of the fibres takes place. The same thing occurs in patients who suffer from emphy-

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sema or asthma and explains why in such diseases both sides of the heart suffer although mechanical obstruction is only exercised against the right side.

It is very evident that under such conditions the primary object must be to relieve the ambarrassed coronary circulation, an object for which digitalis and kindred drugs are peculiarly fitted because not only do they influence the general circulation, but they are directly beneficial to the cardiac muscle in various ways: by slowing the heart they rest the muscle, by increasing the aortic pressure the blood enters the coronary arteries with greater force, and lastly the more powerful contraction of each fibre empties the muscular tissue of its passive congestion, aids in the removal of accumulated waste matter and facilitates a fresh supply of pabulum to the muscle cell. In cases where the myocardial changes are incipient this is all that is required, but in many instances the failure of compensation may have resulted in impaired function of other organs, so that substances which never should have been formed in the body, or under normal conditions would have been excreted, enter the general circulation and act as toxins on the cardiac muscle. In this state of affairs there will require to be a combination of the above treatment with that soon to be discussed under the section on changes due to faulty metabolism, or it may be that the failure has persisted so long or recurred so frequently that the changes in the myocardium are extensive and permanent and are better adapted to such a course of treatment as is recommended for the senile heart.

2. Myocardial changes due to infections. These can be divided into at least two classes, (1) those in which the changes are the result of the influence of the toxin directly upon the cardiac muscle; (2) those in which the infection affects the coronary arteries and induces secondary changes in the muscle fibres. In the first we have diphtheria, rheumatism, smallpox, typhoid fever, erysipelas, pneumonia. My own experience is that in the acute stage of such cases no remedy is so efficacious as the tincture of the chloride of iron in doses of about twenty minims every three hours. Why this particular preparation of iron should be so beneficial I cannot say, but it is the experience of many other clinicians. After the acute stage is passed, arsenic gives better results than iron. So marked is the difference that we might almost venture the suggestion that the chloride of iron influences the toxin, while arsenic exerts itself upon tissue nutrition. The latter part of the hypothesis is certainly in accord with pharmacologists, who have found that in small doses arsenic checks change and decreases nitrogenous elimination. To attain these results the drug is best given as Fowler's solution, three or four drops three times daily and continued for a considerable length of time without increasing the dose. Typhoid fever and syphilis are probably the two infections which most frequently produce changes in the coronary vessels that terminate in myocarditis. The treatment in such cases is the prolonged use of moderate doses of iodide of potash, in the hope that it will by its alterative influence produce a healthier condition of the vessel walls, or at least delay the process of obliteration.

In the treatment of cases belonging to this group such remedies as digitalis take a second place. Since they cannot possibly have any influence upon the toxic process, they are only permissible where, notwithstanding the fact that the work of the heart has been reduced to a minimum, it becomes evident that the circulation is not adequate to the immediate demands of the body. We have then to choose the lesser of two evils, because the failure of circulation through the viscera, including the heart muscle itself, with all the consequent mal-nutrition and mechanical embarrassments, is productive of greater danger to recovery than is the careful and judicious stimulation of an inflamed myocardium. It is almost needless to say that under such conditions the dosage must be carefully watched and the influence on the heart noted from day to day.

3. It has been long recognized that myocardial disturbance is frequently the result of disorders of the alimentary system or defective metabolism, but the interpretation of the relation between the two is of more recent date. Formerly the palpitation, cardiac pain or weakness of which such patients complained was regarded as nervous in character due to some reflex disturbance of the branches of the vagus, but there is little doubt that many of them are the result of toxins upon the cardiac muscle. The physiological experiment that put this matter beyond doubt was the establishment of Eck's fistula, so that substances which should undergo further change in the liver could at once enter the general circulation; when proteids were fed to dogs thus prepared, death rapidly ensued. A recognition of the fact that imperfectly transformed nitrogenous food will result in the formation of muscle poisons that may escape through the liver and have a deleterious influence upon the heart is of the greatest importance, not only because it will explain the existence of many cases of myocarditis, but also for the reason that it indicates the dietetic rules in all cases of the disease. The first effort in the treatment of cases of myocarditis due to alimentary disturbance should be to ascertain where the dietetic error has crept in, for although the muscle poisons are mainly the result of proteid metabolism, it does not necessarily follow that the patient receives too much proteid material; more frequently the trouble is due to interference with digestion or assimilation, and consequently it behooves us to find out where the flaw is, whether it lies in an excess of nitrogenous food, or the form in which it is taken; or the nitrogenous food may be all right both in quantity and quality, but the hydrocarbons or carbohydrates be in excess or of such a nature that they disturb digestion and thus prevent the digestion of an amount of proteid material that is absolutely necessary to the best welfare of the patient; or there may be absence of some of the gastric or intestinal ferments, so that the food does not go through the preliminary chemical processes essen-

tial to its future metabolism; or there may be changes in some of the other viscera, such as hepatic cirrhosis, which diminishes the activity of the organ, and imperfect metabolism results. It is only after such an inquiry as the foregoing that it is possible to say what constituents of the dietary or what organs are responsible for the symptoms and physical signs presented by the patient.

While it is therefore necessary to arrange the diet according to each individual case, there are certain general instructions which may be given to all regarding articles of food to be avoided, intervals between meals, and other matters that are of great importance to secure perfect digestion and metabolism: (1) The daily amount of food should be divided into three meals, all nearly equal in quantity; but the articles that are most difficult of digestion should be taken at the midday meal, and the lightest in the evening. The custom of taking one very hearty meal in the day is to be condemned, especially if that be taken in the evening, while breakfast consists of a little fruit and lunch of a cup of soup and a biscuit. The objections to this common dietetic habit are that it overcharges the blood with a large amount of nitrogenous waste at one time, and furthermore that the stomach will not have time to complete digestion; if, on the other hand, the amount of food be divided up more equally throughout the day, then the waste matter in the circulation is less liable to be in excess of the capabilities of excretion. (2) The meals never should be less than four hours apart, so that the stomach can empty itself and rest before it is called upon to dispose of more ingesta. (3) No food should be taken between meals. (4) A glass of hot water should be taken every night upon retiring, as this is the best way of flushing not only the stomach but also the liver. (5) Alcoholic stimulants should be avoided if possible, but if they must be given, then whisky and water, or a light Moselle wine are to be preferred. Champagnes, sweet and heavy wines should be forbidden.

The medicinal treatment must depend upon the particular flaw in the alimentary system; it may be necessary to give some aids to digestion, such as nux vomica and one or more of the digestive ferments, but personal experience is more in favor of a line of treatment by means of alteratives, especially some form of mercury. The effect of mercury in myocardial troubles is not sufficiently appreciated; the benefit is not simply a result of purgation that could be accomplished equally well by a saline or any other cathartic; not merely the removal of dropsy and œdema, so that respiration is less embarrassed, but clinical experience from before the days of our grandfathers to the present time testifies to the value of mercurials where none of these conditions exist, and records cases of angina pain and precordial distress relieved by their administration. No doubt the improvement is due not simply to the action of these remedies upon the liver, but to an increased activity of the lymphatics and glandular system generally, so that exudates and toxins are rapidly absorbed and excreted, the blood is purified and the quality of all glandular secretions thus improved. When simply the alterative effects are desired, it is my custom to use the protoiodide of mercury in doses of one-quarter of a grain three times daily for ten days or a month, and in addition to this a saline aperient every other morning; when there is œdema or dropsy then the squill, digitalis and blue mass pill three times daily, or a grain of calomel, or five grains of gray powder given with the same frequency for several days, are better adapted to the case. When the patient is distinctly gouty, good results are obtained from colchicum.

So soon as there is reason to believe that the alimentary disturbance has been corrected then an attempt should be made to rehabilitate the muscle fibres, and this is best done by means of arsenic. This remedy should be given for a length of time in small doses, and irritability of the stomach may be overcome by putting four or five drops in a tumblerful of water and instructing the patient to sip this amount in the course of two or three hours. It may be necessary in some cases to use digitalis in addition to the above named remedies, with the object of relieving coronary stasis, but this drug will not have any effect on the myocarditic process and will utterly fail in furnishing relief unless given simply as an adjunct to the alternative and dietetic treatment.

The amount of time at my disposal prevents anything but the most brief summary of the treatment of myocardial changes consequent upon disordered excretion or internal secretions. While medicinal measures may palliate the suffering of the patient, they rarely accomplish anything of a curative or even retarding influence on the case itself.

Bright's disease is probably the most prominent example of disturbed excretion exercising a deleterious influence on the cardiac muscle, and many theories, such as mechanical obstruction in the kidney, loss of internal renal secretion, have been promulgated to account for the cardio-vascular changes, but as none of them have stood the tests of clinical observation or laboratory investigation, we are forced to ask ourselves whether the myocardial changes are secondary to those in the kidney, may they not with equal justice be regarded as part of the same process. The progressive character of nephritis simultaneous with the cardio-vascular changes, the fact that high blood pressure has been demonstrated in the retina coincident with or it has been claimed antecedent to the first evidence of renal disturbance, the multiplicity of exciting causes such as scarlet fever, alcoholism, gout, etc., all of which frequently produce changes in other tissues without any evidence of the kidneys being affected, suggest that the relationship between Bright's disease and myocarditis is one of common cause not of sequence. Croftan's experiments upon rabbits give color to this hypothesis, because he found that frequent injections both of xanthin and hypo-xanthin produced nephritis, cardiac hypertrophy and thickening of the blood vessels due to small

cell infiltration of the intima and adventitia. As both of these substances are derivative of proteid metabolism, they would indicate that the curative treatment of the disease, under this theory, must lie in the regulation of nitrogenous food, that this form of myocarditis must be treated in a way analogous to that due to disorders of the alimentary system and defective metabolism, and this is just where the clinician has placed it for many years; for further progress we must wait until the labors of the chemical pathologist have furnished us with the knowledge necessary to the selection of an appropriate armamentarium.

Diseases of the thyroid gland furnish us with the best example of myocardial disturbance due to disorders of internal secretions. When the cardiac disease is the result of diminished thyroid secretion, as in myxœdema, it is easily remedied by the continual administration of thyroid extract in amounts varying with the exigencies of each case. Prior to the discovery of this method digitalis, strychnine, arsenic and many other remedies were tried ineffectively and the patient drifted slowly to death or insanity.

When the secretion is in excess our hope for relief lies in one of two things, either the spontaneous arrest of the disease or destruction of the gland. Personal experience has been that far more cases were arrested spontaneously without any medical treatment than were improved by ointments, galvanism or any internal medication. Serum and X-ray have yet to establish themselves. In the earlier stages the distressing symptoms are frequently mitigated or relieved by the use of cardiac tonics because the muscle cells are still responsive to their influence, but notwithstanding their use the muscular changes go on unretarded, unless the thyroidism itself is arrested by one of the methods above mentioned, until a stage is reached when the myocardium is absolutely irresponsive to digitalis, strophanthus or any other cardiac tonic. The only hope for the medical cure of this form of myocarditis lies in the discovery of some agent that will control or counteract excessive thyroid secretion.

Cardiac asthenia associated with disease of the suprarenal glands is likewise intractable to treatment. The fact that epinephrin has failed to produce any benefit has made the outlook even more hopeless and has given rise to the idea that epinephrin is neither an antitoxin nor a ferment concerned in metabolism; but that toxins exist in the blood which are normally attached to the suprarenal glands and there destroyed, and that epinephrin is a secretion whose purpose is to modify the blood pressure in the gland according to the demands made upon its activity.

Myocardial changes are frequently due to the existence of neoplasms, but time permits me only to remind you of the role played by uterine myomata in this respect. In the Toland Memorial Lectures for 1904 the subject was discussed at greater length than can be done at the present time. In some instances the change may be secondary to anæmia, but in many others there has not been any hemorrhage, nor does anæemia exist. Thus one patient gave the following blood count: Red cells, 4,700,000; leucocytes, 8,000; numerous blood platelets; hemoglobin, 66 per cent; color index, 0.70. Appearance of blood cells normal. No parasites found. Differential count: Neutro-philes 81 per cent; small lymphocytes, 17.5 per cent; large mononuclears, 1.5 per cent; eosinophiles, 0.0. Kessler believes that the dense tumor so increases the resistence to the blood stream that myocardial changes are a consequence; in one of the cases observed by me the cardiac symptoms began when the tumor was no larger than a walnut, so that there could not be any great increase in resistance, and only ceased with removal of the tumor. Fleck suggests that the myocardial changes and the tumor are due to an abnormal secretion from a diseased ovary; to establish this theory we must have statistics showing what particular ovarian disease yields this abnormal secretion, and in operations, where the heart improved after removal of the fibroid, it should be stated whether the ovary was taken away at the same time. In some cases temporary improvement follows the use of iron and arsenic in combination, but where the malady is associated with progressive cardiac weakness surgical measures should not be delayed until it becomes a question whether the heart is able to endure the strain of the operation. Senile myocardial changes are most frequently the result of an endarteritis gradually obliterating the small coronary arteries and producing degenerative changes in the muscle fibres from defective nutrition; but this is not entirely true, for many cases of senile myocarditis improve upon a restricted diet, which would indicate that the cardiac weakness was not so much due to degeneration of the fibres from diminished blood supply as to their intoxication from excessive or improper pabulum, and hence the rapid improvement when this is withdrawn. Everyone must have noticed that the majority of old men who enjoy good health are frugal in their habits. Eating has become such a social custom instead of a means to maintain life that most people fail to recognize that with increasing years the demand for food for purposes of growth and repair gradually diminishes, but go on eating the same quantity as they did at the age of twenty-five or thirty, unless personal discomfort on account of obesity or indigestion compels them to reluctantly deny the gratification of a palate which it has cost them much to educate. The dietetic suggestions made on the section on disturbance due to faulty metabolism applies with greater force to the patients in the present group. Indeed the closer the diet of the man of 60 resembles that of the boy of 6 the better it will be for his heart.

If the tissue changes are extensive it may be necessary to use cardiac tonics such as arsenic, strychnine or even digitalis to maintain the circulation and prevent coronary stasis. In the use of numbers of the latter group the greatest care must be exercised, the drug given in small doses, and the effect upon the peripheral vessels closely watched. The necessity for this lies in the fact that the blood vessels generally may respond to digitalis very quickly and by

their contraction increase the resistance to the cardiac systole so much as to cause the greatest distress to the patient and place him in actual danger. Under such conditions my custom is to give digitalis and nitroglycerin at the same time, keeping the two drugs separate and varying the dose until the necessary driving power of the digitalis is obtained while the arterial contraction is sufficiently antagonized by the nitroglycerin.

TREATMENT OF HIP-JOINT DISEASE.

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The part in this discussion, which has been assigned to me is the operative treatment, after that by fixation and traction splints and the acute process has passed—and the complications and results of coxitis remain.

Abscess—Is a very frequent complication of hip disease occurring in about fifty per cent of all cases. In those cases in which appropriate treatment is instituted early, not more than twenty per cent suffer from abscess, according to Gibney. Abscess usually results in sinuses which may discharge for a time and eventually heal. A common seat of abscess in hip disease is on the upper and anterior part of the thigh, external to the femoral vessels, but they may occur elsewhere, on inner aspect of the thigh, in gluteal region, or if acetabulum is perforated, above Poupart's ligament in perineum, or open into the bladder or bowel.

In cases of hip disease of long-standing suppuration, the patient may develop progressive emaciation and amyloid changes in liver and kidneys, attended with albuminuria, and anasarca, usually soon followed by death. Abscess may form slowly or rapidly and attain such size as to interfere with wearing apparatus. When pus is diagnosed, it should be aspirated or evacuated by incision. Gibney holds that the most satisfactory results follow repeated aspiration or small incisions, followed by injection of iodoform emulsion, and closure of wound by compresses of gauze, to be repeated as often as cavity refills. The cavity and sinus, in spite of any method, will remain open and discharge until all debris is thrown off from diseased bone and cartilages. Old sinuses should be opened up and curetted, after which they will often rapidly close.

In tuberculous ostitis of the hip, when the process is limited to well defined foci surrounded by firm bone, the condition resembles that of an abscess, and drainage of such focus is desirable, when part is easily accessible, as the knee or os-calcis; but when the epiphysis of femoral head or the acetabulum are attacked, it is difficult to satisfactorily drain or remove diseased tissue: it is not easy to determine by skiagram the existence of a sharply defined focus.

It has been shown by Feiss that tubercular changes may exist in bone in an early stage of development and on the borders of apparent tubercular cavities, and yet not be demonstrable in X-Ray pictures taken of living subjects, especially when taken in the deeper structures. This procedure is most satisfactory when process is near the trochanter, which may be trephined or tunneled for removal of detritus or sequestra.

The operation is performed by exposing the part of bone in which the focus has been located and removing it by thorough curettage. (If in the neck or head of femur, trochanter is exposed with least amount of damage to soft parts and trochanter and neck drilled until head has been reached, or focus or pus found sooner.) The cavity, if there has been one found, after having been scraped, should be dried and wiped out with pure carbolic acid and alcohol, or two and one-half per cent solution of formalin (and wound closed all but temporary gauze wick).

Osteotomy-Gant—Where the joint is partially or completely anchylosed and the leg fixed at a bad angle to the trunk, correction by osteotomy of femur, will diminish deformity when walking, and give greater length to leg. Gant devised this operation in 1872, dividing the femur below trochanter minor. His method has been modified, some using the chisel, others the saw. The only instruments needed are a chisel properly tempered and wooden mallet.

(The patient aseptically prepared, on back or side, sand pillow under leg, chisel is driven into leg, cutting edge being entered in long axis of limb and turned when it pierces periosteum, and then enters the bone, at a right angle.) The chisel should be driven into bone by sharp blows with mallet. The bone should not be entirely divided and when evident that only a shell remains, very little force will make a green stick fracture, and leg be brought to a proper angle to trunk. No manipulation of bone should be made after the partial fracture. It may be necessary to divide bands of contracted fascia in upper thigh to completely extend limb. A properly protected and applied plaster spica is put on to hold the leg in corrected position. All bony prominences must be carefully padded to prevent sloughs. If plaster cast is undesirable, a bed frame with traction or a double Thomas' splint may be used. Confinement to bed for five or six weeks.

If it is desired to compensate for bone shortening, it can be done by putting the leg in an abducted position. Risks attending operation are slight. Hemorrhage is very rare, though accidents have been reported from pressure on femoral vessels by sharp edges of bone. Marked improvement in general condition often follows operation after patient leaves bed. Fixation in plaster splint should be continued six weeks longer. Fixation must not be abandoned too soon as relapse occurs.

The ultimate functional results are excellent and though there may be no motion at hip joint, the lumbar vertebræ are more movable and patient walks with less lurch and deformity. The operation is indicated in all cases of severe deformity in which the distortion seriously interferes with locomotion.

Mr. Robert Jones of Liverpool does a modification of Gant's osteotomy; instead of a chisel and mallet, he uses a pistol shaped saw whose narrow blade ends in a probe point with which he saws